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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,585	03/31/2004	William H. Whitted	16113-1322001	8421

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FISH & RICHARDSON P.C.
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
PAPE, ZACHARY	
ART UNIT	PAPER NUMBER
2835	

NOTIFICATION DATE	DELIVERY MODE
03/12/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	10/816,585	WHITTED, WILLIAM H.	
	Examiner	Art Unit	
	ZACHARY M. PAPE	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *34-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *34-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 January 2009* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The following detailed action is in response to the correspondence filed 1/14/2009.

Claim Objections

2. The objection to claim 45 has been withdrawn.

Drawings

3. **The drawings are objected to because the drawings show a "common controller" which is not disclosed in the written description**. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and

informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The 112 1st paragraph rejection to claims 39 has been withdrawn in view of the Applicant's remarks thereto.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 40 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 40 recites, "a valve controller operated by a common control system as the fan controller" which is new matter which was not originally presented in the application as originally filed. Claim 40 details a valve controller, a fan controller, and a control system which controls each. There is no such corresponding description in the written description. Rather, [0036-0037] of the present written description only defines a valve controller and a fan controller which may communicate with each other.

For the purposes of examination, the limitations will be considered as claimed.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

Claim 40 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 40 recites, "a valve controller operated by a common control system as the fan controller" which is unclear to the Examiner since there is no corresponding drawing or written description. For the purposes of examination, the limitation will be considered as per the rejection below.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 34-36, 38-39, 43-45, 49-50, 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (US 2004/0100770 – hereinafter, "Chu", already of record) in view of Beitelmal et al. (US 2003/0053293 – hereinafter, "Beitelmal", already of record)

With respect to claim 34, Chu teaches (In Figs 11a-11b) a system for cooling electronic components, comprising: a rack structure (That which holds a first row of electronic drawers (13)) holding a plurality of computer boards that support heat-

generating computer components (12, [0002-0006], and [0040]), the rack structure having open first and second sides (Best illustrated in Fig 8b); permitting fluid communication across the computer boards to an exterior of the rack structure (See Figs 11a-11b); a plurality of air circulation fans (11) adjacent one of the first or second sides, wherein each of the circulation fans is located near an edge of one of the computer boards and positioned to circulate cooling air across an associated board, wherein the air circulation fans provide cooling air over the computer boards; wherein cooling air circulated over a first computer board is separate from cooling air circulated over a second computer board adjacent the first computer board (See Fig 11b wherein a single fan 11 is dedicated to a single board in a single container (13) as shown); one or more cooling coils (21) associated with each of the plurality of boards and located near one of the first or second sides of the rack structure (See Fig 5a). Chu fails to teach or suggest a fan controller corresponding to each air circulation fan to control the speed of the corresponding fan according to a temperature sensed around a board corresponding to the air circulation fan. Beitelmal teaches a fan controller (50) corresponding to an air circulation fan (14) to control the speed of the corresponding fan according to a temperature sensed around a board corresponding to the air circulation fan [0031, 0033]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal as per above with that of Chu to provide the ability to increase or decrease the flow rate of cooling fluid [0033]. Increasing or decreasing the fluid rate will allow for more efficient cooling of the electronics.

With respect to claim 35, Chu further teaches that the one or more cooling coils (21) are positioned immediately adjacent to the plurality of circulation fans (11).

With respect to claim 36, Chu in view of Beitelmal further teaches (In Fig 11a) a plurality of rack structures (That which holds a first row of electronic drawers (13), and that which holds a second row of electronic drawers (13), see Fig 11a) each rack structure having associated air fans (11), cooling coils (21), and fan controllers (As per the teachings of Beitelmal), and wherein the rack structures are arranged to form a pair of rows on each side of a central aisle (Space between racks shown in Fig 11a) of a container (See Fig 11a) that houses the plurality of rack structures, the plurality of rack structures accessible from the aisle, with the cooling coils (21) located on sides of the rack structures away from the aisle and near outside walls of the container.

With respect to claim 38, Chu in view of Beitelmal teach the limitations of claim 34 as per above however the embodiment disclosed in Fig 11a of Chu fails to specifically teach or suggest a separate cooling coil for each computer in a rack of computers. However, the embodiment disclosed in Fig 8a of Chu clearly discloses the limitations of claim 38. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the embodiment in Fig 8a with the embodiment of Fig 11a of Chu since if a particular drawer to be pulled or removed from the electronics frame only the corresponding heat exchanger associated with that drawer need to be repositioned [0045].

With respect to claim 39, Chu in view of Beitelmal teach the limitations of claim 38 as per above and further teaches that the air circulation fans (11) are matched to a

space between adjacent boards but fails to specifically teach or suggest that the boards are mounted horizontally on shelves of the rack structure as claimed. The Examiner hereby takes Official Notice of the conventionality of mounting boards with or without containers (12/13 as per Chu) on shelves within a rack structure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings as per the Official Notice above with that of Chu and Beitelmal since shelving provides support and structural integrity to the rack of Chu.

With respect to claim 43, Chu teaches (In Figs 5a and 11a) a system for cooling electronic components, comprising: first and second rows of computer racks arranged on each side of a central aisle (See Fig 11a, wherein the space between respective electronic drawers is the central aisle), each rack including: a frame structure (best described in Fig 8b) defining a plurality of spaces and an open front and back sides (See Fig 8b), wherein the open front side of each rack is accessible from the aisle (See Fig 11a); a plurality of computer boards (12, within 13) holding computing components and mounted in the frame structure (See Fig 5a); a plurality of fans (11) circulating air over the plurality of computer boards, each fan associated with a computer board (within 13, see Figs 11a, b) and a temperature sensor near the computer board [0052]; one or more cooling coils (21) arranged to cool air from the plurality of fans, wherein the cooled air is circulated over a first computer board to an exterior of the frame structure separately from the cooled air circulated over a second computer board adjacent the first computer board (See Figs 11a, b which shows that each board/drawer has its own dedicated fan). Chu fails to teach or suggest a plurality of fan controllers corresponding

to the plurality of fans and programmed to control the speed of each fan according at least to a temperature sensed by each fan's associated temperature sensor. Beitelmal teaches a plurality of fan controllers (50) corresponding to a plurality of fans (14) and programmed to control the speed of each fan according to a temperature sensed by a respectively temperature sensor [0031, 0033]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal with that of Chu to provide the ability to increase or decrease the flow rate of cooling fluid [0033]. Increasing or decreasing the fluid rate will allow for more efficient cooling of the electronics.

With respect to claim 44, Chu further teaches that the open back side of each frame structure is adjacent an exterior wall (That which is connected to 81 as per Fig 11a) of a container that holds the rows of computer racks and the one or more cooling coils (21) located between the open back side and the exterior wall of the container (See Fig 11a).

With respect to claim 45, Chu further teaches that the racks extend substantially the length of the container (See Fig 11b).

With respect to method claims 49-50, 52 the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu and Beitelmal references as per the rejections above.

8. Claims 37, 46, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Rumbut, Jr. (US 5,740,018 – hereinafter, "Rumbut")

With respect to claims 37 and 46, Chu in view of Beitelmal teach the limitations of claims 36 and 43 as per above but fails to teach or suggest the limitations of claims 37 or 46. Rumbut teaches a cooling module (250) outside of a container (200) which fluidly connects to cooling coils. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Rumbut as per above with that of Chu to provide a device which will remove heat from the fluid and thus allow the heat to be moved from the rack structure to an external area.

With respect to method claim 51, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal, and Rumbut references as per the rejection above.

9. Claims 41 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Laffranchi (US 3,889,746).

With respect to claims 41 and 47, Chu in view of Beitelmal teach the limitations of claims 34 and 43 as per above but fails to teach or suggest the limitations of claims 41 or 47. Laffranchi, however, teaches one or more cooling coils include coolant conduits having an external member and an inner baffle defining an annular channel therebetween and through which a cooling liquid flows (See, Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to

combine the teachings of Laffranchi with that of Chu and Beitelmal to provide for a smooth continuation of flow in the pipe line (Col 1, Line 67 – Col 2, Line 1).

10. **Claims 42, 48 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Etter (US 6,407,567).**

With respect to claims 42 and 48, Chu in view of Beitelmal teach the limitations of claims 34 and 43 as per above but fails to teach or suggest the limitations of claims 42 and 48. Etter, however, teaches individually controlling fans to provide the appropriate air flow rate for an individual heat generating device (Col 3, Lines 28-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Etter with that of Chu and Beitelmal to provide for a more efficient cooling apparatus (I.E. having fans provide only enough airflow that is necessary reduces power consumption).

With respect to method claims 55, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal and Etter references as per the rejection above.

11. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Takahashi et al. (US 6,530,347 - hereinafter, "Takahashi").

With respect to claim 53, Chu in view of Beitelmal teach the limitations of claim 48 as per the rejection above and Beitelmal further teaches the conventionality of having a valve (42) which controls a fluid flow. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal as per above with that of Chu to provide for a means to control the fluid flow through the coils of Chu.

With respect to the remaining limitations of claim 53, Chu in view of Beitelmal fail to teach or suggest the remaining limitations. Takahashi, however, teaches modulating a cooling liquid to the cooling coils though a valve; and controlling the valve according to at least one of a temperature and a pressure of the cooling fluid (Col 8, Lines 18-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Takahashi with that of Chu and Beitelmal to prevent damage to the electrical components by assuring that there is enough coolant at the proper temperature to provide adequate cooling (Takahashi, Col 1, Lines 30-33).

12. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Takahashi and further in view of Laffranchi.

With respect to claim 54, Chu, Beitelmal and Takahashi all teach the limitations of claim 52 as per above but fail to teach the limitations of claim 54. Laffranchi teaches the limitations of claim 53 as per the rejection to claims 41 and 46. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine

the teachings of Laffranchi with that of Chu, Beitelmal, and Takahashi to provide for a smooth continuation of flow in the pipe line (Col 1, Line 67 – Col 2, Line 1).

13. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Patel et al. (US 2003/0147214 – hereinafter, "Patel").

With respect to claim 56, Chu in view of Beitelmal teaches the limitations of claim 34 as per above but fails to specifically teach or suggest the limitations of claim 56. Patel, however, teaches a controller (90) used to regulate both a valve (which supplies liquid coolant to cool an electronic device) and a fan (see [0029] and [0056]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Patel with that of Chu and Beitelmal to provide optimized cooling and efficiency of the cooling system of Chu (see Patel [0056]).

Response to Arguments

14. Applicant's arguments filed 1/14/2009 with respect to the 112 rejection to claim 39 has been fully considered and is persuasive. Therefore the 112 rejection to claim 39 has been withdrawn as per above.

15. Applicant's arguments filed 1/14/2009 with respect to the 112 rejection to claim 40, and the 103 rejections to the claims have been fully considered but they are not persuasive.

16. With respect to the Applicant's remarks to the 112 rejections to claim 40, the Examiner respectfully notes that the cited portions of the present written description does not detail, "a valve controller operated by a common control system as the fan controller" as claimed, rather the description clearly identifies two control systems which may communicate with each other.

17. With respect to the Applicant's remarks to claim 34 that Chu fails to teach or suggest the added limitations of claim 34, the Examiner respectfully disagrees and notes the rejection to claim 34 as per above. Specifically, the Examiner notes Figs 11a and 11b which clearly discloses two racks of electronic devices disposed in a housing with an aisle therebetween.

18. With respect to the Applicant's remarks to claim 43 that Chu fails to teach or suggest the added limitation that the open front side of each rack is accessible from the aisle, the Examiner respectfully disagrees. Fig 8b shows that each rack has an open front side as claimed, and further Fig 11a of Chu teaches the two racks which are directly adjacent each other with a small aisle therebetween. Additionally as shown in Fig 11a the open front side of each rack is accessible from the aisle in that the open front portion can be accessed from the aisle (I.E. the aisle opens up to the open front portion – the same as in the present invention).

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZACHARY M. PAPE whose telephone number is (571)272-2201. The examiner can normally be reached on Mon.- Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash Gandhi can be reached on 571-272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zachary M Pape/
Examiner, Art Unit 2835

/Jayprakash N Gandhi/
Supervisory Patent Examiner, Art Unit 2835